communication which is not only of the highest scientific interest, but also of practical importance.

The following messages and particulars referring to them appeared in the *Times* of December 22 and December 23:—

Ottawa, December 21.

The first message to be sent across the Atlantic Ocean by wireless telegraphy was despatched to-day to King Edward by Lord Minto. Notice of its successful transmission was received to-night by the Governor in the following message:—

"Glace Bay, Cape Breton.

"I have the honour to inform your Excellency that your message to his Majesty has now been transmitted by me from Cape Breton to Cornwall by wireless telegraphy, and has been forwarded to its destination.—G. MARCONI."

Lord Minto replied as follows:—

"I am delighted at your message, which I have just received. My warmest congratulations on your spendid success."

December 22.

King Edward has replied to Lord Minto's telegram sent to His Majesty by Signor Marconi's apparatus, as follows:—

"I am much interested by the wireless message which you have sent me, and am delighted at the success of Signor Marconi's great invention, which brings Great Britain and Canada into still closer connection.—EDWARD."

On Monday, the *Times* published the following message from its correspondent at Glace Bay:—

"Being present at its transmission in Signor Marconi's Canadian station, I have the honour to send through the *Times* the inventor's first wireless Transatlantic message of greeting to England and Italy."

The following message, also transmitted by wireless telegraphy, was published on Tuesday:—

The Government of Canada, through the *Times*, desires to congratulate the British people on the accomplishment by Marconi of the greatest feat which modern science has yet achieved.

"CARTWRIGHT, Acting Premier,
"Ottawa, December 21."

NOTES.

THE King of Denmark has conferred upon Lord Lister the honour of Knighthood of the Grand Cross of the Order of Dannebrog.

M. DARBOUX, permanent secretary of the Paris Academy of Sciences, has been appointed a member of the Bureau des Longitudes in succession to the late Prof. Cornu.

Mr. C. A. ANGOT, of the Bureau central météorologique de France, and Prof. W. L. Moore, of the United States Weather Bureau, have been elected honorary members of the Royal Meteorological Society.

THE council of the Manchester Literary and Philosophical Society has awarded the Wilde gold medal for 1903 to Prof. F. W. Clarke, of the United States Geological Survey, and a Dalton medal to Prof. Osborne Reynolds, F.R.S. In view of the fact that next year will mark the centenary of the discovery by Dalton of the atomic theory, Prof. Clarke (whose writings on the atomic weights are well known) has also been invited and has consented to deliver the Wilde lecture for 1903. The presentation of the medals and the delivery of the lecture will probably take place in May, 1903.

AT the general meeting of the Zoological Society of London on December 18, it was announced that Mr. William Lutley Sclater had been selected by the council out of twenty-two applicants for the vacant post of secretary. Mr. Sclater is now director of the South African Museum, Cape Town and has previously held appointments as science master at Eton and as assistant director of the Indian Museum, Calcutta. He is a well known authority on the mammals and birds of India and Africa, and on other zoological subjects, and is at present editing a series of volumes on the fauna of South Africa, of which four have already been published.

WE regret to record the death, on December 13, of Dr. John Young, late professor of natural history in Glasgow University since 1866.

THE death is announced of Prof. Zaayer, professor of anatomy in the University of Leyden. The death is also announced of Prof. Leonard Landois, professor of physiology at the University of Greifswald (Pomerania).

MR. T. BRICE PHILLIPS, of Uckfield, has been awarded the prize of fifty pounds, together with a silver medal, offered by the council of the Society of Arts for his essay on "Existing Laws, By-laws and Regulations Relating to Protection from Fire, with Criticisms and Suggestions." Prizes of ten pounds with a bronze medal have also been awarded to Mr. George H. Paul and to Dr. W. C. Henderson.

IT is announced in *Science* that the Section of Geology and Geography of the American Association for the Advancement of Science, which will meet at Washington on December 27, has arranged to devote a session of the meeting to the discussion of the recent eruptions of Mont Pelée and La Soufriere by Messrs. Russell, Hill, Heilprin, Jaggar, Curtis and Hovey, who visited the islands of Martinique and St. Vincent a few months ago.

THE Coats family have given 10,000*l.* between them to the cancer research scheme, 5000*l.* being from Sir Thomas Coats and family, and 5000*l.* from Mr. Archibald Coats and his two brothers. The *Times* states that a few more such contributions would bring the fund up to the required amount, and would enable the investigations to be carried through on the comprehensive lines indicated in the scheme which was formulated and is being directed by the Royal Colleges of Physicians and Surgeons.

A REUTER message states that at 9.30 a.m. on December 16, Andijan, in the province of Fergana, Russian Central Asia, was totally destroyed by an earthquake. Andijan is a town of about 50,000 inhabitants. According to a rough estimate, 16,000 houses have been destroyed and 2500 persons killed as a result of the earthquake. Subterranean rumblings and tremblings of the earth continue. At New Marghelan, the capital of Fergana province, the shock lasted nearly three minutes. The direction was from north-east to south-west.

A TELEGRAM to the Paris *Petit Journal*, dated December 17, states that for several days past Mount Vesuvius has been throwing out rock masses, vapour and dust.

WE learn from the *Times* that news has been received at Stockholm that the Swedish Antarctic exploration ship *Antarctic* left Tierra del Fuego at the beginning of November on its second summer expedition. It was expected that the expedition, after some cartographic work and natural historical research in the northern and western portions of the Dirck Gerritz Archipelago, would arrive about December 10 at the winter quarters in Snow Hill Land, where Dr. Nordenskjöld would resume the leadership of the entire expedition. The *Antarctic* will probably return to Port Stanley (Falkland Islands) at the end of February or the beginning of March.

IN the House of Commons on December 16, the President of the Board of Trade was asked whether he was aware that three dangerous varieties of colour-blindness escaped detection by the Board of Trade test, whilst many normal-sighted persons were rejected by it. In reply, Mr. Gerald Balfour said the present system was adopted on the recommendation of a committee appointed by the council of the Royal Society, and that the Board of Trade in doubtful cases had the assistance of the gentleman who acted as secretary to the committee. The President of the Board of Trade said he did not think there was any necessity for a small departmental committee to reconsider the test in the light of recent discoveries, as had been suggested.

MR. FRANCIS WATTS, Government Analyst and Agricultural Chemist for the Leeward Islands, sends us from Antigua the following particulars of recent high tides received from correspondents in various neighbouring islands, and possibly connected with changes due to the late volcanic disturbances:—*Barbuda.* During the month of October and early in November, the tide was abnormally high, the rise being from 18 inches to 2 feet above the ordinary. Old inhabitants do not remember a like rise, except perhaps in a severe gale such as a hurricane, and then only for a short time.—Oliver Nugent. *Nevis.* Tides unusually high for eight or nine days, commencing about November 1.—R. B. Roden. *Dominica.* Tides unusually high for few weeks ending November 12, the level being constantly at about high-water mark. No determination had been made whether this was caused by high tides or change of level.—W. H. Porter. *Tortola.* Tides much higher than usual—a fact generally commented upon and noticed while bathing. No exact observations made, but the difference could safely be put down as a foot in depth.—Dr. Cookman. Referring to these records, Mr. Watts remarks, "Of course, it may turn out that there has simply been an abnormally high tide throughout the Leeward Islands, but so far the tide does not seem to have returned to its normal height. Observations will be continued and submitted from time to time. It will not be a very easy matter to determine if there have been slight changes of level, particularly in places where the shore is very steep, as it is in many of the islands of volcanic origin."

AN aëronautical problem of some interest, and of far less difficulty than the problem of artificial flight, is the performance of journeys across the sea in a balloon. In *La Nature* for November 15, Lieut.-Colonel G. Espitalier gives an illustrated account of M. Henri Hervé's balloon, the *Méditerranéen* No. 2, and the methods adopted for directing it at sea. In order to prevent the balloon from being depressed by a shower of rain, its top part terminates in a cone. Instead of trailing a single guide rope, M. Hervé proposes a system of "triangulation," consisting of a trailer floating at the end of a long rope behind the balloon, and a balance weight hanging in the water by a nearly vertical and shorter rope, the resistance of the latter body being necessarily smaller than that of the former. The sea itself furnishes an inexhaustible supply of ballast, and this can be drawn up into a cylindrical reservoir suspended above the balance weight, a suction hose being used for filling the reservoir when required. This "compensator" is fixed near the surface of the water. M. Hervé employs two deviators for diverting his balloon by the action of the water, one, which he calls a "minimum deviator," for angles of about 30°, and the other, the "maximum deviator," for angles which are alleged to reach as much as 70° or 80°. M. Hervé first experimented in this direction on the North Sea in 1886, and last year he transferred the seat of his operations to the Mediterranean.

IN a message from Buenos Ayres, a correspondent of the *Times* states that Mr. Reginald Rankin made the ascent of Aconcagua alone on December 14, having been deserted by his native guide. Being caught by a snowstorm, Mr. Rankin spent the night in the open at 22,000 feet, and on December 15 walked and rode continuously to Puente del Inca, a journey of 12½ hours, with frostbitten hands and feet. His toes have had to be amputated, but his fingers will probably be saved.

UNTIL recently, a rule has been in force in the Lahore Veterinary College prohibiting *post-mortem* examinations of cows or pigs or any other "sacred or prohibited animals." We learn from the *Pioneer Mail* that the principal has subjected the carcass of a bull to examination for educational purposes and has declared that in future the thing will be done as a matter of course. The Bengali Press is indignant and prophesies the most dire results to British rule if the practice is continued, but it is difficult to see how veterinary surgeons can be trained satisfactorily without practical dissection of the kind to which objection is taken.

IN our correspondence columns of December 4 (p. 103), under the title "Germs in Space," the suggestion was made that the dust which reaches the earth from space may contain living as well as dead matter. Mr. John Munro writes to say that in the "Bijou" biography of Lord Kelvin, published some time ago, the same view is expressed in the following passage. The passage runs (p. 81):—"Nay, it seems rather a crude hypothesis, for the seeds of life may be floating like meteorites in space and ready to sow the crust of a new and virgin planet."

DR. H. HERGESELL, President of the International Aëronautical Committee, states that the results hitherto obtained from the monthly balloon ascents have justified in every way the continuation of the experiments, and that it is proposed to continue them during the year 1903. During the current year, about 110 registering balloons and 52 manned balloons have been sent up. In addition, kites have been regularly employed in Europe and Boston, U.S.; on two occasions, they were also flown from steamers on the Lake of Constance. The complete results for the year 1901 will be published shortly, and those for 1902 are also in the press.

SEVERAL interesting articles of a semi-scientific nature appear in the Christmas number of the *Gardener's Magazine*, notably the description by Mr. J. Yeld of a climbing tour through the south-western Alps, and a historical account of the gardens at Hampton Court by Mr. G. Gordon. A calendar for the new year is included in the issue.

AN investigation into the causes of larch and spruce fir canker, by Mr. George Massee, forms the subject of a publication by the Board of Agriculture. The fungus which generally attacks the larch is *Dasyscypha calycina*, and an allied species, *Dasyscypha resinaria*, is mainly the source of trouble in spruce canker; but these species are not easily distinguishable except to the expert. These two forms are not confined to the larch and spruce, but they may attack certain pines and firs, while other species also are destructive to coniferous trees. Mr. Massee confirms Hartwig's conclusions that they are wound parasites and finds that aphides are frequently the cause of trouble, although late frosts, which induce rupture of the bark and consequently extrusion of sap, are also a source of danger. Seedlings and young trees may be protected by spraying, but in the case of older trees the disease cannot be eradicated.

A HISTORY of systematic botany prior to Linnæus is given by Dr. B. Schorler in the *Sitzungsberichte* of the "Isis" Society of Dresden. To Aristotle is attributed the commencement of the study of botany as a branch of science; Theophrastus observed about 450 plants, Dioscorides about 800. According to Dr. Schorler, the earliest herbariums now extant are those of Aldrovandi in Bologna, Girault in Paris, Caesalpini in Florence, Hernandez in Escurial (Spain), Rauwolff in Leiden, Harder in Ulm, Ratzenberger in Cassel, Caspar Bauhin in Basle and von Burser in Upsala.

IN a series of articles upon the dissociation of matter, which have been published in some of the recent issues of the *Revue Scientifique*, M. Gustave le Bon gives an interesting account, partly historical and partly descriptive, of the experiments performed by himself and others on radio-activity, and of the theories which have been based upon them. The final conclusion at which he arrives is that kathode rays, X-rays and all the various phenomena of radio-activity appear to be particular aspects of a new form of energy which is as common in nature as electricity or heat, and the closer study of which may reveal to us a connecting link between matter and energy.

WE have received a copy of vol. xvi. of the *Journal* of the College of Science of the Imperial University of Tokyo, which contains a number of interesting contributions on electrical subjects. The first of these, from the pen of Mr. Y. Homma, discusses some of the observations on atmospheric electricity made at the Central Meteorological Observatory of Japan, dealing more especially with the effects of wind, fog, rain and snow on the atmospheric potential. The remaining papers, six in number, are contributed by Prof. Nagaoka, Mr. K. Honda and others, and all deal with magnetostriction and other allied phenomena in ferromagnetic substances. Those interested in the subject may be referred to these papers as containing the records of much valuable experimental work.

REFERRING in these columns a few weeks ago to the manufacture of apparatus from vitreous silica, the hope was expressed that our manufacturers at home were not going to be left behind in the application of this art. We have since learnt that Messrs. Baird and Tatlock have been manufacturing silica vessels by Mr. Shenstone's process for the past eighteen months and are prepared to make a variety of apparatus to specification.

THE Paris correspondent of the *Times* states that an automobile system is to be tried on the lines of the Paris-Lyons-Marseilles Railway. The trial trip is to be made by three cars next June from Paris to Dijon, and it is hoped to cover the 300 kilometres in a little more than three hours, or at an average rate of about sixty miles an hour. Each car is to be of the same size as an ordinary corridor carriage and capable of seating forty passengers; the petroleum engine is at the front of the car. The cars are to be built by Messrs. Gardner and Serpollet and will have the same weight as a corridor carriage. At present it is only intended to try the system for passenger traffic, but if it is successful it will doubtless be widely extended. It is also announced that a similar system is to be tried on the North-Eastern Railway between Hartlepool and West Hartlepool, where there is keen competition between the railway and the tramway. These cars are to carry a petrol engine driving a dynamo which will generate electric current for the actual driving motors.

A BRIEF description of the laboratories recently fitted up for electrochemical analysis at the Chemical Institute at Nancy is given by M. Arth, director of the Institute, in *l'Eclairage Électrique* for December 13. There are two rooms, one of which serves as a balance and apparatus room, the other containing the working benches. The laboratory proper is fitted up with two double tables each capable of accommodating eight students and a single table having room for two more. Each student has at his disposal two sets of leads, which can be connected to a supply of suitable voltage, a rheostat, and terminals by means of which an ammeter and voltmeter can be put in circuit. There is one ammeter and voltmeter provided between the four students working at the same side of the table, so that they have to make their measurements in turn, but these are so connected that the measurements can be made without interrupting the circuit. Extra terminals are, however, provided, by means of which additional apparatus can be connected in circuit. The circuits are purposely so arranged that the operations are not made too automatic, but the student has to understand what he is doing each time he makes a connection or a measurement. A full set of platinum electrodes, dishes, &c., completes the equipment.

THE river terraces in New England form the subject of an essay by Prof. W. M. Davis (*Bulletin* Museum Comp. Zool., Harvard College, vol. xxxviii.). He discusses the formation of terraces in valleys occupied by drift, and urges the importance of studying them in plan as well as in section. He points out that they may be accounted for, firstly, by the behaviour of a meandering and swinging stream, slowly degrading the valley deposits; and, secondly, by the control exerted here and there over the lateral swinging of the stream through the opening up of previously buried rock-ledges. The effects of uplift on the formation of terraces and rock-platforms are duly considered.

A MEMOIR on the geology of Lower Strathspey, by Mr. L. W. Hinxman and Mr. J. S. Grant Wilson, has been issued by the Geological Survey. The region described, which is in the counties of Elgin and Banff, is formed mainly of igneous and metamorphic rocks with a considerable area of Old Red Sandstone. The metamorphic rocks include granulitic schistose rocks of the Central Highland or Moine schist type, and various quartzites, schists and limestones with associated igneous rocks, grouped as the Banffshire series. To this series the foliated granites belong, while of later date is the great granite mass of Ben Rinnes and the Convals, which forms the dominant feature of the district. The petrography is dealt with by Dr. Flett. Two divisions of Old Red Sandstone are noted, the Middle or Orcadian and the Upper, and between these there is unconformity, as the Upper Old Red Sandstone rests on the basal conglomerates of the Orcadian series and extends on to the crystalline schists. Dr. Traquair contributes an interesting note on the general distribution of fishes in the Old Red Sandstone, observing that there are "three distinct fish-faunæ," while Mr. Kidston, in a note on the fossil plants, remarks that they also show a clearly defined threefold division of this formation. Glacial drifts extend over much of the ground, with the exception of the higher hill tops, and they present many features of interest.

A SUPPLEMENTARY list of lantern slides, recently issued by Messrs. Newton and Co., contains particulars of many slides of scientific interest. Among the subjects of slides suitable for science lectures or lessons are British reptiles and other animals, photographed from life by Mr. D. English; butterflies and moths; trees and plants; photographs of ripples on mercury and water, by Dr. J. H. Vincent; sound waves, by Prof. R. W. Wood; and photomicrographs by Dr. Spitta to illustrate the morphology of the malarial parasite.

IN the November number of the *Field Naturalist's Quarterly*, Dr. G. Leighton reopens the question of adders swallowing their young. Although he is unable to cite any definite instance of the occurrence of the phenomenon, he shows that some of the objections which have been urged against it are based on a misinterpretation of anatomical facts, and demonstrates that there is nothing inherently impossible in its taking place. As the gullet of an adder is perfectly capable of containing the body of a field-mouse, and as frogs are known to live for a considerable time after being swallowed by snakes, there is no reason why young adders should not be swallowed by their parent without being killed. The question remains, however, to be proved by positive evidence. "Of the possibility of the phenomenon," writes the author, "we have not the slightest doubt, of the probability of it we have considerable doubt."

WE have received from the publisher, Herr G. Fischer, of Jena, an interesting pamphlet by Prof. Max Weber, of Amsterdam, entitled "The Indo-Australian Archipelago and the

History of its Fauna." In a previous essay, the author has adduced evidence to show that Celebes should be referred to the Oriental rather than to the Australasian region, the Moluccan Channel, and not the Macassar Strait, forming the division between the two areas. In the present communication, he endorses the opinion that marsupials and monotremes reached Australasia from Asia. According to the author's view, in pre-Tertiary—very likely Cretaceous—times Australia was united by land with Asia. A Euro-Asiatic fauna inhabited this land, from which during the Eocene a southern portion was cut off by partial submergence, this southern portion being the modern Australia and New Guinea, the home of monotremes, marsupials and ancient forms of other groups, such as cassowaries and birds-of-paradise, while widely distributed specialised types are wanting. Northwards extended a coral-sea, in the islands of which dwelt primitive rodents, insectivores and other ancient groups, with perhaps cuscuses. During the Miocene, great changes of level took place in the Archipelago, which attained its present form in the Pleistocene. Celebes was insulated early, Java late. Intermittent land-connections took place, which allowed of periodical immigrations of Asiatic forms from one side and of Australian types from the other. The question is left undecided whether the cuscuses of the Austro-Malay islands are remnants of the primitive Euro-Asiatic fauna or later immigrants from Australia. The suggestion is also made that the Australian and Philippine rodents are relicts of the original pre-Tertiary fauna, although it is admitted that the specialisation of Hydromys is against this. The author fails to see any evidence in favour of a former connection of Australasia with either South America or Antarctica.

THE Rev. George Grenfell, of the Baptist Missionary Society, has constructed a map of the Congo River between Leopoldville and Stanley Falls from running surveys made during 1884–89 in the steamers *Peace* and *Goodwill*. The map is in ten sections, two on a sheet, and the five sheets are published in a convenient case by the Royal Geographical Society. A reprint of Mr. Grenfell's article, "The Upper Congo as a Waterway," which was printed in the *Geographical Journal* for November, 1902, accompanies the map and serves the purpose of explanatory notes.

THE "Englishwoman's Year Book and Directory, 1903," shows in a most convincing manner the ever-increasing part that women are taking in the work of the world. The editor has again obtained able assistance in the preparation of many of the sections, those dealing with science, medicine and education being typical instances. The original work in science done by women workers, a list of colleges where women may study, the names of women holding college appointments, and a list of scientific societies of which women may be members, are some of the subjects included in the science section.

THE issue for 1903 of the well-known annual biographical dictionary, "Who's Who," is considerably larger than previous editions, though all the preliminary tables which have appeared in former years have been removed, except that enumerating the members of the Royal family and the obituary for the year ending September 30, 1902. As usual, prominence is given to the biographies of men who have distinguished themselves in various branches of science, whether pure or applied, and the information is generally trustworthy as well as interesting. The annual is one of the few which can justly be termed indispensable books of reference.

A TRANSLATION, by Prof. J. D. Everett, F.R.S., and Miss Alice Everett, of Dr. H. Hovestadt's "Jena Glass and its Scientific and Industrial Applications," which was reviewed in our issue for December 20, 1900, has been published by Messrs. Macmillan and Co., Ltd., at 15*s*. net. With a view to make the book as clear as possible to English readers, the translators have given the spirit rather than the letter of the original, and they have, in cases where it seemed desirable, added brief explanations, which are always distinguished from the text. Some few matters of subordinate interest have been condensed. The details of an important application of science to industry will, by the aid of this translation, now be accessible to British students and opticians unfamiliar with the German language.

THE permanent seismological commission appointed two years ago by the Imperial Academy of Sciences of St. Petersburg has recently issued its first report, a quarto volume of more than two hundred pages. Most of the papers are written in Russian, and only one of these is accompanied by a summary in French. Several communications deal with the foundation of the International Association of Seismology at Strassburg in 1901; in others, Prof. Lewitski describes experiments with simple seismoscopes and with seismographs the movements of which are registered mechanically. The president of the commission considers the theory of the horizontal pendulum and Mr. B. Galitzin that of other seismographs, the latter erroneously attributing Darwin's bifilar pendulum to Davison. General Pomerantzeff contributes an examination of the seismogram traced at Strassburg on June 24 1901, and concludes that it is extremely difficult to explain the oscillations of horizontal pendulums during earthquakes either by tilts of the ground or by horizontal displacements alone, although they might be produced by a combination of such movements.

A SPECIAL report on the mineral waters of Kansas has been made by Mr. E. H. S. Bailey, with the assistance of Messrs. E. B. Knerr, Crane and McFarland, for the University Geological Survey of Kansas, which is conducted under the authority of the Board of Regents of the University of Kansas. The volume runs to 343 pp. and is divided into two parts; the former provides a discussion of the subject of mineral waters in general, while the latter arranges and classifies those of Kansas and supplies full analyses of a great number of samples of them. Many illustrations and one or two maps add to the value and interest of the report.

OUR ASTRONOMICAL COLUMN.

COMET 1902 *d*.—Herr M. Ebell has calculated the following elements for this comet from observations made on December 3 (Königsberg), December 5 (Hamburg, two observations) and December 7 (Heidelberg):—

T = 1903 April 19·441 Berlin M.T.

$$\left.\begin{array}{rl} \omega = & 51^\circ\ 51'\cdot2 \\ \Omega = & 112\ \ 54\cdot9 \\ i = & 42\ \ 10\cdot5 \\ \log q = & 0\cdot17344 \end{array}\right\} 1902$$

The ephemeris which accompanies these elements estimates that the brightness of the comet on December 31 will be 2·4, its brightness on December 2 being taken as unity.

THE ALGOL VARIABLE R.V. (13, 1902) LYRÆ.—In *Circular* No. 66 of the Harvard College Observatory, Prof. Pickering gives the results of an examination of some of the Draper memorial photographs in regard to the new Algol variable, R.V. Lyræ, recently discovered by Mr. Stanley Williams. From a photograph taken July 11d. 18h. 0m., 1893, a correction of +4h. or −2h. to Mr. Williams's ephemeris is obtained, but which of these values is the right one Prof. Pickering has not yet been able to determine.

PROPER MOTION AND PARALLAX OF NOVA PERSEI.—In the *Astronomische Nachrichten* (No. 3834), Herr Asten Bergstrand details the observations he has made in order to determine the proper motion and the parallax of Nova Persei.

Using the astrographic refractors of the Upsala Observatory, Herr Bergstrand has obtained eighteen negatives of the Nova